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# SOME OBSERVATIONS ON THE SPORE DISCHARGE OF THE HIGHER FUNGI<sup>1</sup>

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## ABSTRACT

(a) *The drop-discharge mechanism in the Basidiomycetes.* The Hymenomycetes, Uredineae, some Tilletiaceae, for example, *Tilletia Tritici* and *T. laevis*, and the three species of the basidiomycetous yeast-genus *Sporobolomyces* all develop and discharge their basidiospores in an identical manner. In these fungi: (1) every basidiospore is developed asymmetrically on the end of a conical sterigma; (2) the spore-hilum is formed at the apex of the sterigma; (3) a few seconds before a spore is discharged a drop of fluid is excreted at the spore-hilum; and (4) the spore and the drop are shot violently away together to a distance, varying with different species, of about 0.05–1.4 mm. The drop-discharge mechanism here involved has received no adequate explanation. It is possible that the sterigma and its spore together constitute a surface-tension gun of such a nature that the force of discharge resides in the surface tension of the drop of fluid. Since the Hymenomycetes, the Uredineae, *Tilletia*, and *Sporobolomyces* develop and discharge their basidiospores in an identical manner, they probably owe their origin to a common ancestor.

(b) *The discharge of spores in the Discomycetes and the phenomenon of puffing.* The author has studied the hymenium of certain Discomycetes in surface view and in sections taken in a radial-longitudinal direction through the apothecium. Hitherto no one seems to have investigated the Discomycetes in this manner.

In *Sarcoscypha protracta* Fr. the apothecium is more or less deeply conical, the asci have straight axes, and the operculum of each ascus is situated not symmetrically at the end of the ascus, but asymmetrically, so that it looks toward the mouth of the apothecium as a whole. The result of this is that, when an ascus explodes, it shoots away its spores not perpendicularly to the surface of the hymenium, but in a direction more or less parallel to the central axis of the apothecium. Owing to these arrangements the spores of all the asci easily escape into the air above the apothecium so that they can be carried off by the wind.

The author has devised an experiment with a test-tube having a lateral opening near its end, which conclusively proves that when a fruit-body of *Sarcoscypha protracta* puffs, it produces a blast of air. The air is set in motion by the simultaneous impingement upon it of vast numbers of spores and drops of

<sup>1</sup> Presented before the International Congress of Plant Sciences, Section of Mycology, Ithaca New York, Aug. 18, 1926.



ascus-sap. Puffing is a biologically advantageous phenomenon in that the disturbance of the air caused by it aid in the dispersion of the spores.

In most Discomycetes, for example, *Morchella conica*, *Aleuria vesiculosa*, *Galactinia badia*, *Lachnea scutellata* and *Ascobolus immersus*, the asci are heliotropic, that is, their outer ends bend so that they point toward the direction from which the strongest light comes, and the operculum is situated symmetrically at the apex of each ascus. The result of these arrangements is that, when the asci explode, the spores are successfully shot away from the fruit-bodies into the outer air.



